Standards-in-Action 2.0

State-Based Curriculum Review

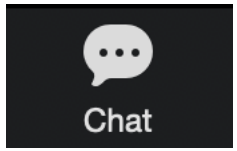
# Quality Mathematical Tasks

# Welcome back!

# Disclaimer

This presentation was produced and funded in whole with Federal funds from the U.S. Department of Education under contract number ED-991990018C0040 with StandardsWork, Inc. Ronna Spacone serves as the Contracting Officer's Representative. There is content on the slides and additional content in the Slide Notes throughout the presentation. The content of this presentation does not necessarily reflect the views or policies of the U.S. Department of Education nor does the mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

# Let's Hear From You!




Type your response and comments in the group chat. We'll ask everyone to enter their responses at the same time.

- *CHAT: Thus far, have you found ample English learner (EL) supports in the curriculum you're reviewing?*

We'll ask everyone to hit "enter" at the same time so...

***WAIT to hit "enter"!***

# Agenda

- Overview of Dimension 4 and its research base
- Introduction to the content criteria for Dimension 4
- Breakout work session #1 with your team
- Review of substantiations and rating of content criteria in the Example Workbook
- Introduction to the English learner (EL) support criteria for Dimension 4
- Breakout work session #2 with your team
- Review of substantiations and ratings in the Example Workbook
- Next steps and final questions

# Meeting Norms and Expectations

1. Be present and engage fully.
2. Ask questions.
3. Prepare for productive struggle.
4. Consider differing perspectives.
5. Create and maintain a safe space for professional learning.
6. Be mindful of different learning styles.

# Research Base for Dimension 4

Research published by the National Research Council (2001 and 2012) shows that:

- Students must be encouraged and assisted to engage regularly in thinking, reasoning, and sense-making in the mathematics classroom.
- When students solve problems, they gain a deeper understanding of the mathematics and an ability to demonstrate complex thinking, reasoning, and communication skills.
- Mathematical competency depends on more than simply storing knowledge; it must be represented and organized so it can be retrieved and applied.

# What Does Research on Quality Tasks Mean for High-Quality Curriculum?

The inclusion of high-quality mathematical tasks in curriculum:

- Encourages flexible reasoning skills that can carry over into all parts of the students' lives;
- Teaches students to use math flexibly; and
- Prepares students to "think on their feet" — something highly regarded in the professional world.

# What Are Mathematical Tasks?

**Mathematical tasks**…

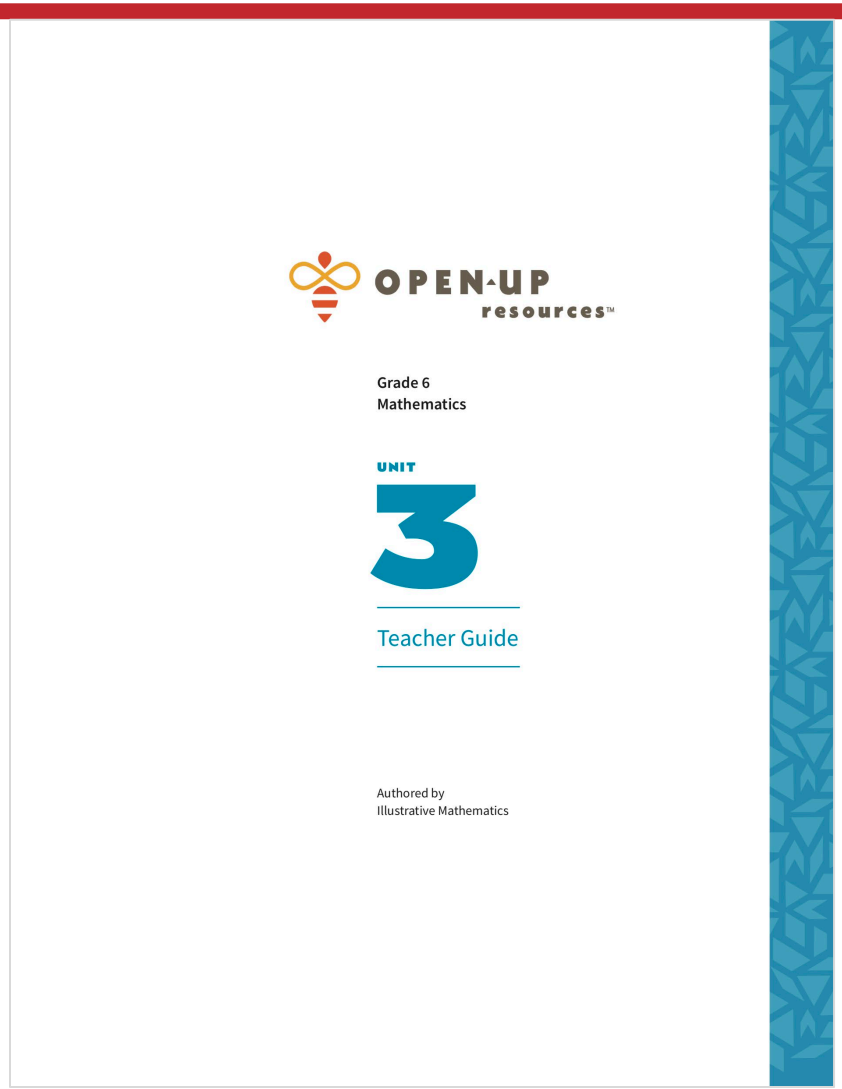
- are practice worksheets, word problems, applications, or modeling opportunities that focus students' attention on particular mathematical ideas and that…
- provide opportunities to develop or use a particular mathematical habit of mind.

# What Are Mathematical Tasks? (cont'd.)

**<u>Quality</u> mathematical tasks:**

- Have well-defined purposes;
- Offer reasonable chances of fulfilling their purposes when used appropriately;
- Provide ways for students to step into the task even when the route to a solution may initially be unclear; and
- Are applicable to a wide range of students (i.e., "rich" tasks).

# Illustrative Mathematics

# Standards for Mathematical Practice

- **MP.1** Make sense of problems and persevere in solving them.
- **MP.2** Reason abstractly and quantitatively.
- **MP.3** Construct viable arguments and critique the reasoning of others.
- **MP.4** Model with mathematics.
- **MP.5** Use appropriate tools strategically.
- **MP.6** Attend to precision.
- **MP.7** Look for and make use of structure.
- **MP.8** Look for and express regularity in repeated reasoning.

# Dimension 4: Quality Mathematical Tasks

**Dimension 4**
Quality Mathematical Tasks

***Review Content Criteria for Dimension 4:*** *Note criteria with asterisks (*) for EL support.*

1 ____**Content Criterion.** Curriculum includes a variety of high-quality tasks that are measurable and aligned to instructional objectives outlined in the standards. *

- Are there frequent opportunities for students to engage with sufficiently challenging tasks that apply significant and engaging mathematics?
- Do tasks involve all three aspects of rigor?
- Do tasks include opportunities for students to employ relevant Standards for Mathematical Practice?
- Do tasks provide sufficient guidance for students to complete them successfully and for teachers to administer and assess them effectively?

***Substantiation:***

2 ____ **Content Criterion.** Curriculum includes application problems that are primarily on-level and that embody the critical concepts of the level.

- Are most application problems designed to promote and assess student understanding of the most critical mathematical concepts required for the level?
- Are application problems that address past or supporting concepts sufficiently minimized and clearly connected to the critical concepts for the level?

***Substantiation:***

3 ____ **Content Criterion.** Curriculum suggests providing ample time for students to orient themselves to a problem and challenges them to make sense of problems without over scaffolding. *

- Do at least some problems, activities and assessments require students to independently strategize and formulate problems and/or to defend their findings?
- Do the lessons provide examples that model reasoning for a variety of problem types, rather than providing problem-solving formulas?
- Do answer keys, rubrics and scoring guidelines clearly connect to the requirements of targeted standards and provide sufficient guidance for interpreting student performance?

***Substantiation:***

4 ____ **Content Criterion.** Curriculum correctly portrays modeling as the application of mathematics to authentic problems that arise in everyday life, society or the workplace. Students are expected to solve un-scaffolded modeling problems that require independent thinking and decision making.

- Are there application problems that require students to do more than simply use manipulatives, explain their process, or convert between representations?
- Are there opportunities for students to solve authentic, real-world problems that require at least some modeling with mathematics?
- Are there opportunities for students to work and think independently?

***Substantiation:***

5 ____ **Content Criterion.** Curriculum encourages students to produce multi-modal representations of terms and concepts when solving problems and justifying solutions.*

- Do the demands of instructional tasks and applications regularly ask students to show their thinking in multiple ways (e.g., in words and a drawing or graph).
- Do lessons regularly include examples that demonstrate multiple ways to represent mathematical concepts, both during the problem-solving process and in presenting solutions?

***Substantiation:***

***Dimension 4: Rating for Content Alignment***

_____ 2 Most or all components of the content criteria are present

_____ 1 Some components of the content criteria are present

_____ 0 Few or no components of the content criteria are present

***Summary Comments:***

# Content Alignment Criteria

# Dimension 4: Content Criterion 1

Curriculum includes a variety of high-quality tasks that are measurable and aligned to instructional objectives outlined in the standards.* ←

**Ask Yourself:**

- *Are there frequent opportunities for students to engage with sufficiently challenging tasks that apply significant and engaging mathematics?*

- *Do tasks involve all three aspects of rigor?*

# Dimension 4: Content Criterion 1, cont'd.

- *Do tasks include opportunities for students to employ relevant Standards for Mathematical Practice?*
- *Do tasks provide sufficient guidance for students to complete them successfully and for teachers to administer and assess them effectively?*

# Dimension 4: Content Criterion 2

Curriculum includes application problems that are primarily on-level and that embody the critical concepts of the level.

**Ask Yourself:**

- *Are most application problems designed to promote and assess student understanding of the most critical mathematical concepts required for the level?*

- *Are application problems that address past or supporting concepts sufficiently minimized and clearly connected to the critical concepts for the level?*

# Dimension 4: Content Criterion 3

Curriculum suggests providing ample time for students to orient themselves to a problem and challenges them to make sense of problems without over scaffolding.*

**Ask Yourself:**

- *Do at least some problems, activities, and assessments require students to independently strategize and formulate problems and/or to defend their findings?*
- *Do the lessons provide examples that model reasoning for a variety of problem types, rather than providing problem-solving formulas?*
- *Do answer keys, rubrics, and scoring guidelines clearly connect to the requirements of targeted standards and provide sufficient guidance for interpreting student performance?*

# Dimension 4: Content Criterion 4

Curriculum correctly portrays modeling as the application of mathematics to authentic problems that arise in everyday life, society, or the workplace. Students are expected to solve un-scaffolded modeling problems that require independent thinking and decision making.

**Ask Yourself:**

- *Are there application problems that require students to do more than simply use manipulatives, explain their process, or convert between representations?*
- *Are there opportunities for students to solve authentic, real-world problems that require at least some modeling with mathematics?*
- *Are there opportunities for students to work and think independently?*

# Dimension 4: Content Criterion 5

Curriculum encourages students to produce multi-modal representations of terms and concepts when solving problems and justifying solutions.*

**Ask Yourself:**

- *Do the demands of instructional tasks and applications regularly ask students to show their thinking in multiple ways (e.g., in words and a drawing or graph)?*

- *Do lessons regularly include examples that demonstrate multiple ways to represent mathematical concepts, both during the problem-solving process and in presenting solutions?*

# Rating for Content Alignment

**2 Points:** Most or all components of the content criteria are present.

**1 Point:** Some components of the content criteria are present.

**0 Points:** Few or no components of the content criteria are present.

# Breakout Time: 35 minutes

Your turn to work with your team:

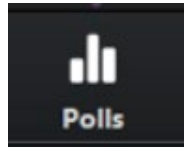
- Examine the evidence in the curriculum for each of these content criteria.
- Check the content criteria that are evident and cite where you found evidence in your notes.
- Discuss the evidence you found for all the content criteria with your team and agree upon a rating for the dimension.
- When we reconvene, we will ask you to share comparisons of your rating, criteria checks, substantiations, and commentary.

# Breakout Materials

- Your copy of the Participant Workbook (p. 11)
- Curriculum: Illustrative Mathematics:
  - Grade 6 Course Guide
  - Grade 6, Unit 3 Teacher Guide
- Resource: Standards for Mathematical Practice
- Resource: Critical Concepts and Fluencies of the Level

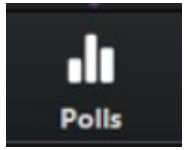
# Welcome Back!

# Let's Hear From You!




- POLL: What is your rating for **Dimension 4 Content Alignment**?
  - 2 points: Most or all components of the content criteria are present.
  - 1 point: Some components of the content criteria are present.
  - 0 points: Few or no components of the content criteria are present.

# Let's Hear From You!

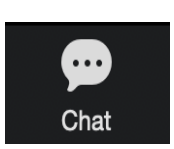


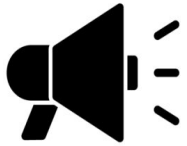

- POLL: Did you check (as present) the same criteria as in the Example Workbook?

  O Yes, I checked the same criteria as the example.

  O No, I checked one or more criteria differently than the example.

# Let's Discuss!



Let's take 5 minutes to review the Example Workbook that contains the substantiations for the content criteria.

Then in the group chat, share your answer to this question:

- *CHAT: How do your substantiations compare to the example?*

Now let's hear from you about the evidence you found and noted in your Summary Comments.

# EL Support Criteria

# Dimension 4: Quality Mathematical Tasks

***Review EL Supports for Dimension 4:***

1

____ **EL Support.** Curriculum encourages the teacher to present oral and visual directions, to repeat the directions and to check for understanding by asking students to restate them.

***Substantiation:***

2

____ **EL Support.** Curriculum offers teachers guidance on how to provide explicit, constructive and targeted feedback on student work.

***Substantiation:***

**Dimension 4: Rating for EL Supports** *(include asterisked Content Criteria #1, #3 and #5 in your rating)*

____2 Most or all components of the EL supports are present

____1 Some components of the EL supports are present

____0 Few or no components of the EL supports are present

***Summary Comments:***

# Dimension 4: EL Support Criteria

(1) Curriculum encourages the teacher to present oral and visual directions, to repeat the directions, and to check for understanding by asking students to restate them.

(2) Curriculum offers teachers guidance on how to provide explicit, constructive, and targeted feedback on student work.

# Rating for EL Supports

**2 Points:** Most or all components of the EL supports are present.

**1 Point:** Some components of the EL supports are present.

**0 Points:** Few or no components of the EL supports are present.

# Breakout Time: 20 minutes

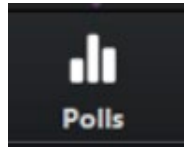
- Individually scan the curriculum for evidence of each of the EL supports, including the asterisked content criteria.
- Discuss with your team and agree on whether there is evidence in the curriculum for each EL support criterion.
- Check those for which you found evidence and determine the "weight" of the missing supports or parts of supports.
- Make notes about your findings.
- Together, assign a rating for the dimension's EL supports. (Include the asterisked content criteria.)
- When we reconvene, we will ask you to share comparisons of your rating, criteria checks, substantiations, and commentary.

# Breakout Materials

- Your copy of the Participant Workbook (p. 10)
- Curriculum: Illustrative Mathematics:
  - Grade 6 Course Guide
  - Grade 6, Unit 3 Teacher Guide
- Resource: Standards for Mathematical Practice
- Resource: Critical Concepts and Fluencies of the Level

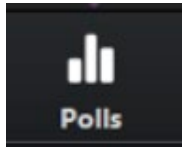
# Welcome Back!

# Let's Hear From You!




- POLL: What is your rating for **Dimension 4 EL Supports**?
  - 2 points: Most or all components of the criteria are present.
  - 1 point: Some components of the criteria are present.
  - 0 points: Few or no components of the criteria are present.

# Let's Hear From You!

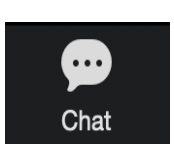


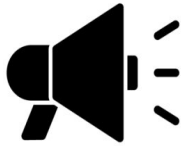

- POLL: Did you check (as present) the same criteria as in the Example Workbook?

  O Yes, we checked the same criteria as the example.

  O No, we checked one or more criteria differently than the example.

# Let's Discuss!



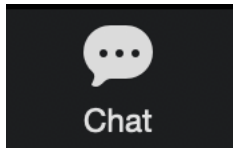
Let's take 5 minutes to review the Example Workbook that contains the substantiations for the EL support criteria.

Then in the group chat, share your answer to this question:

- *CHAT: How do your substantiations compare to the example?*

Now let's hear from you about the evidence you found and noted in your Summary Comments.

# Let's Chat!




In the group chat, share your answer to this question in one word or phrase:

- *CHAT: What is something you have learned today (or better understand) about the importance of quality mathematical tasks to understanding content?*

We'll ask everyone to hit "enter" at the same time so…

***WAIT to hit "enter"!***

# Overall Rating

# Example Overall Rating

Let's recall how the SIA 2.0 coaching team rated the four dimensions:

| | Content | EL Supports |
|---|---|---|
| **Dimension 1** | 2 (Most or all) | 1 (Some) |
| **Dimension 2** | 2 (Most or all) | 2 (Most or all) |
| **Dimension 3** | 2 (Most or all) | 2 (Most or all with small gaps) |
| **Dimension 4** | 2 (Most or all) | 2 (Most or all with small gaps) |
| **Totals:** | **8** (Well Aligned) | **7** (Well Aligned) |

# Example Overall Rating, cont'd.

Let's recall how the team rated the four dimensions:

| Overall Rating: Content Alignment | Overall Rating: English Learner Supports |
|---|---|
| __√__Well Aligned (6–8 points) | __√__Well Supported (6–8 points) |
| _____Somewhat Aligned (3–5 points) | _____Somewhat Supported (3–5 points) |
| _____Not Aligned (0–2 points) | _____Not Well Supported (0–2 points) |

**Summary Comments and Recommendations:**

*The content criteria are very well addressed in this curriculum. It is particularly strong in keeping its focus on the most critical concepts of the level; demonstrating progressions within, and between, the levels; and using high quality mathematical tasks to form a more complete understanding of the concepts, as well as student understanding. There are a few areas where English Learners could be better supported. This is particularly true for mathematical language acquisition. A few fairly simple modifications or notes to the teacher could result in better alignment for most of the missing elements of the criteria.*

# Sustaining Your Curriculum Review Efforts

- These tools are designed to help you expand the decision-making capacity of educators across your state. This will help them become skilled at making judgments about the quality of curricula in use.
- As you moved through the curriculum review trainings, you have been thinking through how you will sustain the curriculum work in your state. It's time to put those thoughts to work!

# Sustaining Your Curriculum Review Efforts, cont'd.

You will be able to use the curriculum training and tools to:

- Analyze the degree of alignment of curricula in use in your programs;
- Assist programs in recognizing when they should replace current curricula for better aligned products;
- Create a thoughtful plan to modify or combine existing resources to fill any gaps found in existing curricula; and
- Make purchasing decisions about prospective curricula.


# Thank you!